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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,926	02/14/2002	James Robert Howard		8465

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12/22/2003

James Howard
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EXAMINER

MACCHIAROLO, PETER J

ART UNIT	PAPER NUMBER
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2875

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,926

Applicant(s)

HOWARD ET AL.

Examiner

Peter J Macchiarolo

Art Unit

2875

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 1-27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0202.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on February 14, 2002 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because there are several instances where different reference characters have been used to designate the same parts. For example, reference numerals 11 and 24 have both been used to designate a surface device. Although the Examiner appreciates 11 is a side view and 24 is a top view of a surface device, this manner of referencing is confusing.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 25, 33.

4. The drawings are objected to because the capacitor laminate and the layers as recited in claim 1 are not clearly shown. The Examiner is interpreting the capacitor laminate to be shown as reference numeral 13 and the unlabeled substance sandwiched therebetween in figure 1, and the layers being 14 and 15.

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the method for forming a PCB as recited in claims 17-23, and 27 and the conductive layer as recited in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

6. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

7. **The claims objected to because of the following informalities:**

8. The claim structure used by Applicant does not conform to standard U.S. practice, and is difficult to interpret. Specifically, the claims do not clearly contain a preamble, a transitional word, or a main body. The multiple occurrences of colons in claims 1 and 24 further inhibits proper comprehension of the claim's structure. See MPEP §608.01(m). The Examiner recommends the following claim structure:

[Preamble] [transitional word]:

[limitation X];

[limitation Y]; and

[limitation Z].

9. The Examiner notes a repeated word, "the" in line 1 of claim 5.
10. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. **Claims 1, 17-19, and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.**

12. Claims 1, 17, and 24 contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The drawings, and specification are silent to all of the optical elements being electrically connected in the Z-axis to all other printed circuit board elements and surface devices.

13. The Examiner notes that figure 1 of the instant application enables only reference numeral 17 (optical generation/reception element) being electrically connected to some of the printed circuit boards elements and surface devices, and fails to enable one skilled in the art to electrically connect the optical transmission element. The Examiner is therefore interpreting this limitation as shown in the drawings, i.e. that at least one of the optical elements are electrically connected in the Z-axis to at least one printed circuit board element or surface devices.

14. Claims 18 and 19 contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The drawings, and specification are silent to a method for forming a PCB wherein the conductive material is removed by chemical etching, and the optical path is formed by laser ablation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (USPN 5,525,190; "Wojnarowski") in view of Howard et al (USPN 5,155,655; "Howard").

16. In regards to claims 1-4, Wojnarowski discloses in figures 5 and 11, a printed circuit board (PCB), comprising multiple layers (86, 88, 104) laminated about optical generation, transmission and reception elements on a ceramic substrate (120), the optical elements including a generation device (52, 80), a transmission element (66, 74) to provide an optically clear path between generation and reception elements, and a reception device (50b, 82), all optical elements being located on the same plane and the generation device is connected electrically in the Z axis (via metalized conductor 92) to other printed circuit board elements or surface devices.

17. Wojnarowski is silent to the substrate being a capacitor laminate including two sheets of conductive material and one sheet of intermediate dielectric material

18. However, Howard teaches that using a capacitor laminate as a substrate for PCB's provides a number of important advantages in PCB design¹.

19. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the PCB of Wojnarowski, and using Howard's capacitor

¹ Howard, col. 2, ll. 39-46.

laminate instead of Wojnarowski's ceramic substrate, since this configuration will benefit from the advantages as taught by Howard.

20. The Examiner notes that the claim limitations in claims 2-4 are drawn to processes of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

21. In regards to claims 5-10 Wojnarowski further teaches and shows in figure 11 that other electro-optical devices, such as senders and receivers, may be connected to the optical reception device, and have blind, plated vias which connect the electro-optical device to other PCB elements through the Z axis by the use of blind, buried, or subcomposite plated vias.

22. Although Wojnarowski and Howard are both silent to using a conductive polymer vias, it would have been obvious to one having ordinary skill in the art that the time the invention was made to use a conductive polymer via, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Further, one would be motivated to use a conductive polymer via for a variety of reasons, including material availability and manufacturing processes with sensitive requirements.

23. In regards to claims 11-16, and 24-27, Wojnarowski and Howard teach all of the recited limitations of claims 5, 6, and 7, (above).

24. Wojnarowski further shows in figure 4 that the optical elements are laminated within the PCB.

25. Wojnarowski is silent to multiple layers of optical elements.

26. However, having multiple layers with the above configuration is a matter of obvious design choice, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Pater Co. v. Bemis Co.*, 193 USPQ 8. Further, one of ordinary skill in the art will appreciate that layering Wojnarowski's PCB, as shown in figure 11, will decrease the physical size needed for multiple opto-electrical connections, which will have a clear advantage in some markets.

27. Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the PCB of Wojnarowski and Howard with multiple layers of Wojnarowski's device.

28. The Examiner notes while Wojnarowski and Howard are silent to a method of manufacturing such a device, the steps of placing, securing, laminating, and forming are very broad. Hence, the structure taught by Wojnarowski and Howard meets Applicant's recited method step limitations.

29. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the PCB of Wojnarowski and Howard with the method of claim 27, since the method steps are obvious in light of the resultant structure.

30. In regards to claims 17-23, Wojnarowski and Howard teach the resultant structure of claim 17 (above).

31. Wojnarowski further discloses that the optical paths are filled with an optically conductive polymer, and the conductive layers are formed an etching technique and the optical path is formed in the conductive layer by lasers².

32. Although Wojnarowski is silent to using chemical etching or laser ablation, the Examiner takes official notice that these are well known in the art to be acceptable forms of utilizing a photoresist or etching method, and one would be motivated to use these for a variety of reasons, including material availability and manufacturing requirements.

33. Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the PCB as taught by Wojnarowski and Howard with the method of claim 17 including chemical etching and laser ablation.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (703) 305-7198.

The examiner can normally be reached on 7.30 - 4:30, M-F.

36. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703) 305-4939. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

² Wojnarowski, abstract; col. 1, line 62 to col. 2, line 14; and col. 2, ll. 42-56.

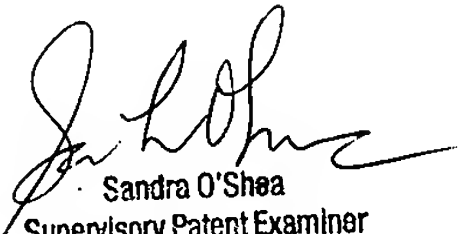
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37. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

pjm



Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800